

Remarks

The present amendment is in response to the Office action dated October 25, 2007, where the Examiner has rejected claims 1-13. In the present amendment, claims 1-4, 7 and 9 have been amended and new claims 14-18 have been added. Accordingly, claims 1-18 are pending in the present application with claims 1, 7 and 14 being the independent claims. Reconsideration and allowance of pending claims 1-18 in view of the amendments and the following remarks are respectfully requested.

A. Rejection of Claims 1-6 Under 35 USC §103(a)

In the Office Action, claims 1-6 have been rejected under 35 U.S.C. 103(a) as unpatentable over International Patent Application No. 2001/084209 (“Soenksen”) in view of U.S. Patent No. 6,215,892 (“Douglass”) and U.S. Patent No. 6,714,281 (“Amano”). The office action relies on Soenksen (Applicant’s own application) for the line scan camera related elements. Applicant points out that the novel line scan camera based virtual microscopy system developed by Aperio Technologies, Inc. (assignee of the present application and many related U.S. and European patents) operates fundamentally different from conventional area scan systems. Accordingly, use of the line scan camera required development of similarly novel methods to carry out the purposes of the virtual microscopy system. The claimed methods for pre-focus in the present application are such novel methods.

The Office Action cites Douglass and Amano as disclosing the other elements of claims 1-6. Applicant believes that the amended claims distinguish Douglas and Amano as set forth below.

An invention is unpatentable if the differences between it and the prior art would have been obvious at the time of the invention. As stated in MPEP § 2143, there are three requirements to establish a *prima facie* case of obviousness.

First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure.

1. Suggestion or Motivation to Combine

The Amano and Douglass references both disclose focus techniques to be applied during image capture and the motivation to combine these references is supported in the office action.

2. Reasonable Expectation of Success

The Office Action does not clearly demonstrate that the techniques disclosed in Amano and Douglass would succeed if deployed in a linear array based slide scanner. It appears that the disclosure from Douglass and Amano could be successfully applied to Applicant's point-focus method. However, the disclosure from Douglass and Amano could not be successfully applied to the ribbon-focus method because it requires image data to be received while the stage is in relative motion to the objective lens. Using the conventional area scan cameras of Douglass and Amano, relative motion would result in significant blur and completely frustrate the ability of the system to determine the height of best focus for any given point. Accordingly, a *prima facie* case of obviousness has not been made for claims 7-13.

3. Combined References Must Teach All Claim Limitations

With respect to the third prong of an obviousness analysis, the combination of Douglass and Amano does not yield all of the limitations of amended independent claims 1 or 7. Claim 1 has been amended to include the steps of combining a plurality of objective lens heights into a non-planar focal surface where points on the focal surface other than the measured focus points are determined by estimating the objective lens height.

The Office Action cites Douglass as disclosing combining objective lens heights into a focal surface. However, what Douglass discloses (Figs. 14-15 and column 11, lines 41-65) is the creation of a focal plane. Applicant has clarified claim 1 in that the focal surface is non-planar. The disclosure in Douglass, in contrast, requires that the array of focus positions are processed such that a least squares plane is fit to the array of focus positions (column 11, lines 50-52). Further, Douglass describes that focus point lying too far above or below the "best-fit plane" are discarded and then the data is refit – meaning that the least squares plane is recalculated after eliminating the outliers. Accordingly, Douglass describes creating a focus plane, which is very different from creating a non-

planar focal surface, as required by claim 1. Amano does not cure the deficiencies of Douglass in this regard and therefore Applicant believes that independent claim 1 is presently in condition for allowance and a notice of allowance including claim 1 and its respective dependent claims is respectfully requested.

With respect to amended claim 2, Applicant has included steps for creating a non-planar focal surface that are not described by Douglass or Amano. Specifically, claim 2 requires connecting an objective lens height with a pair of neighboring objective lens heights to define a triangular region and then combining a plurality of the triangular regions into a non-planar focal surface. In contrast, Douglass discloses eliminating outlying focus points and then calculating a best-fit plane that approximates the tilt of the slide in its carrier (column 10, lines 55-65). Douglass does not disclose or even contemplate a non-planar focal surface.

B. Rejection of Claims 7-13 Under 35 USC §103(a)

In the Office Action, claims 7-8 have been rejected under 35 U.S.C. 103(a) as unpatentable over Soenksen in view of Amano and claims 9-13 have been rejected in further view of Douglass. Independent claim 7 is directed toward a ribbon-focus embodiment that requires that the stage be in motion and during the movement of the stage the height of the objective lens relative to the stage is continuously adjusted. Neither Amano nor Douglass discloses capturing image data for focus analysis while the stage and objective lens are in relative motion.

Claim 7 has been amended to clarify that the objective lens is moved relative to the stage and that a plurality of objective lens locations are determined. Applicant asserts that Amano and Douglass do not disclose these features of independent claim 7 and respectfully requests a notice of allowance including claim 7 and its respective dependent claims.

Furthermore, claim 9 has been amended to clarify that the objective lens height on the non-planar focal surface is estimated at locations other than the plurality of objective lens locations that were previously determined.

C. New Claims 14 – 18

New independent claim 14 and new dependent claims 15-18 have been added. Claim 14 is directed toward a ribbon-focus method not disclosed by Douglass or Amano. Claim 14 further requires that a scan area be defined and then divided into strips that each include opposing edges of the scan area. Conventional area scan systems such as those described by Douglass and Amano are incapable of doing this. Claim 14 also requires that strips be processed by determining a non-planar focal surface for the strip (not the entire slide) and then scanning an image of the strip. Two or more strips are then composed into a contiguous digital image of the specimen.

Douglass and Amano do not disclose the elements of claim 14. Neither reference discloses a non-planar focal surface. Neither reference discloses dividing the scan area into a plurality of linear strips where each strip includes two opposing edges of the scan area. Additionally, neither reference discloses creating more than one focal surface for the scanning of a single slide, as required by claim 14. Accordingly, applicant believes that independent claim 14 and its respective dependent claims are presently in condition for allowance and a notice of allowance is respectfully requested.

Conclusion

If the Examiner has any questions or comments regarding the above Amendments and Remarks or believes that a telephone conversation may be useful in advancing prosecution, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,
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Dated: April 24, 2008

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